

AMENDMENT

IN THE CLAIMS:

Please amend the claims as follows:

1. (Withdrawn, Currently amended) A transparent and impact-resistant polymer material comprising a brittle matrix (I) having a glass transition temperature of greater than 0°C in which is dispersed a block copolymer (II) of formula B-(A)_n, n being between 2 and 20, with a polydispersity of between 1.5 and 3, B being a polymer block with a glass transition temperature of less than 0°C and with a polydispersity index of less than 2 and A being a polymer block with a glass transition temperature of greater than 0°C, A being compatible with the matrix, wherein the block copolymer (II) is obtained controlled radical polymerization in the presence of a nitroxide, and wherein the relative lengths of the first block B and the block A are such that $n \cdot \text{Mn(A)} / (n \cdot \text{Mn(A)} + \text{Mn(B)})$ is between 0.5 and 0.95, wherein Mn is the number-average molecular mass of the polymer and n is a number greater than 2 or Mn(B) is greater than or equal to the mean entanglement length of the first block B.
2. (Withdrawn, Previously presented) The material as claimed in claim 1, wherein the block copolymer has a polydispersity of between 1.8 and 2.7.
3. (Withdrawn, Previously presented) The material as claimed in claim 1, wherein the proportion of brittle matrix is between 0 and 95%.
4. (Withdrawn, Previously presented) The material as claimed in claim 3, wherein the proportion of brittle matrix is between 10 and 85%.
5. (Withdrawn, Previously presented) The material as claimed in claim 1, wherein the brittle matrix is greater than 50% by weight of at least one polymer selected from the group consisting of poly(methyl methacrylate), polystyrene, poly(vinylidene fluoride), polyesters, polycarbonate, poly(vinyl chloride), polyamide, polyepoxides, polyethylene, polyacrylonitrile and their copolymers.

6. (Withdrawn, Previously presented) The material as claimed in claim 1, wherein A represents from 50 to 95% by weight of the total weight of the block copolymer (II).

7. (Withdrawn, Previously presented) The material as claimed in claim 6, wherein A represents from 60 to 90% by weight of the total weight of the block copolymer (II).

8. (Withdrawn, Previously presented) The material as claimed in claim 1, wherein B is a polyacrylate with a glass transition temperature of less than 0°C.

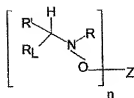
9. (Withdrawn, Previously presented) The material as claimed in claim 1, wherein A is a polymethacrylate with a glass transition temperature of greater than 0°C.

10. (Withdrawn, Previously presented) The material as claimed in claim 1, wherein the block B exhibits an average mass of greater than 5000 g/mol.

11. (Canceled)

12. (Currently amended) A process for the preparation of a transparent and impact-resistant polymer material comprising a brittle matrix (I) having a glass transition temperature of greater than 0°C in which is dispersed a block copolymer (II) of formula B-(A)_n, n being between 2 and 20, with a polydispersity of between 1.5 and 3, B being a polymer block with a glass transition temperature of less than 0°C and with a polydispersity index of less than 2 and A being a polymer block with a glass transition temperature of greater than 0°C, A being compatible with the matrix, wherein the block copolymer (II) is obtained by controlled radical polymerization in the presence of a nitroxide, comprising

(1) preparing the first block B by mixing the monomer(s) with an alkoxyamine of formula:



- where R' and R, which are identical or different, optionally connected so as to form a ring, are alkyl groups having between 1 and 40 carbon atoms optionally substituted by hydroxyl, alkoxy or amino groups; - where R_L is a monovalent group with a molar mass of greater than 16 g/mol; and- where Z is a polyvalent radical carrying end functional groups of styrol or acryloyl, adding a nitroxide, and

carrying out the polymerization at temperatures ranging from 60 to 250°C, ~~for~~ pressures ranging from 0.100 bar to 80 bar,

(2) diluting the first block B obtained in the mixture of monomers intended to form the block A compatible to the brittle matrix which is desired to see reinforced against impact, adding between 0 and 100 molar equivalents of a radical polymerization initiator, carrying out the polymerization at temperatures ranging from 60 to 250°C, and ~~for~~ pressures ranging from 0.100 bar to 80 bar, the conversion of the monomer ~~varies~~ being from 10 to 100%, and

separating the polymer obtained from the residual monomers by evaporation under vacuum at temperatures ranging up to 250°C,

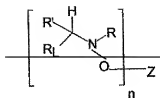
(3) mixing the product obtained in step (2) with the brittle matrix which it is desired to see reinforced against impact, optionally in the presence of other additives, and

wherein the relative lengths of the first block B and the block A are selected such that $n \cdot \text{Mn(A)} / (n \cdot \text{Mn(A)} + \text{Mn(B)})$ is between 0.5 and 0.95, wherein Mn is the number-average molecular mass of the polymer and n is a number greater than 2 or Mn(B) is greater than or equal to the mean entanglement length of the first block B.

13. (Withdrawn, Currently amended) The process according to claim 35, and further comprising A process for the preparation of the material of claim 1, comprising

(1) preparing the first block B by mixing the monomer(s) with an alkoxyamine of

formula:



—where R' and R, which are identical or different, optionally connected to form a ring, are alkyl groups having between 1 and 40 carbon atoms optionally substituted by hydroxyl, alkoxy or amino groups; —where R₁ is a monovalent group with a molar mass of greater than 16 g/mol; and —where Z is a polyvalent radical carrying end functional groups;

adding a nitroxide, and

carrying out the polymerization at temperatures ranging from 60 to 250°C, for pressures ranging from 0.100 bar to 80 bar;

(2) diluting the first block B obtained in the mixture of monomers intended to form the block A;

adding between 0 and 100 molar equivalents of a radical polymerization initiator to this mixture, and

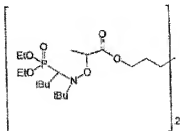
carrying out the polymerization at temperatures ranging from 60 to 250°C, and for pressures ranging from 0.100 bar to 80 bar, the conversion of the monomer varies from 10 to 100%, and

separating the polymer obtained from the residual monomers by evaporation under vacuum at temperatures ranging up to 250°C;

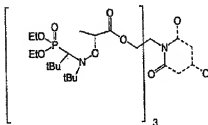
(3) diluting the product obtained step (2) in a mixture of monomers selected from the group consisting of styrene, MMA, epoxides, mixtures of diols and of diacid, or precursors of polyamides' lactam or mixtures, diamine, and diacids, and

polymerizing the combination as described step (2).

14. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the alkoxyamine used corresponds to the following formula:



15. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the alkoxyamine used corresponds to the formula:



16. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the polydispersity is between 2 and 2.5.

17. (Previously presented) The process as claimed in claim 34, wherein the average mass is greater than 20,000 g/mol.

18. (Previously presented) The process as claimed in claim 34, wherein the average mass is greater than 60,000 g/mol.

19. (Canceled)

20. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the polymerization temperature in step (1) is from 90 to 160°C and the pressure is from 0.5 bar to 10 bar, the polymerization temperature in step (2) is from 90 to 160°C and the pressure is from 0.5

bar to 10 bar, and the evaporation temperature is 200°C.

21–23. (Canceled)

24. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein R and R' are tert-butyl groups.

25. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein R₁ is a phosphorus group or a phosphonate group of formula:



- where R'' and R''', which are identical or different, optionally connected so as to form a ring, are alkyl groups having between 1 and 40 carbon atoms optionally substituted by hydroxyl, alkoxy or amino groups.

26. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the brittle matrix is selected from the group consisting of PMMA, polyesters of PET or PBT, polystyrene, PVDF, polyamides, polycarbonates and PVC.

27. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the additives include a second impact modifier.

28. (Previously presented) The process according to claim 27, wherein the impact modifier is an acrylic impact modifier.

29. (Canceled)

30. (Withdrawn, Currently amended) The process of ~~claim 29~~ claim 25, wherein R'' and R''' are ethyl groups.

31. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the block copolymer has a polydispersity of between 1.8 and 2.7.

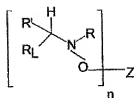
32. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the proportion of brittle matrix is between 10 and 85%.

33. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the brittle matrix is greater than 50% by weight of at least one polymer selected from the group consisting of poly(methyl methacrylate), polystyrene, poly(vinylidene fluoride), polyesters, polycarbonate, poly(vinyl chloride), polyamide, polyepoxides, polyethylene, polyacrylonitrile and their copolymers.

34. (Currently amended) The process as claimed in ~~claim 12~~ claim 35, wherein the block B exhibits an average mass of greater than 5000 g/mol.

35. (Currently amended) A process for the preparation of a transparent and impact-resistant polymer material comprising a brittle matrix (I) having a glass transition temperature of greater than 0°C in which is dispersed a block copolymer (II) of formula B-(A)_n, n being between 2 and 20, with a polydispersity of between 1.5 and 3, B being a polymer block with a glass transition temperature of less than 0°C and with a polydispersity index of less than 2 and A being a polymer block with a glass transition temperature of greater than 0°C, A being compatible with the matrix, wherein the block copolymer (II) is obtained by controlled radical polymerization in the presence of a nitroxide, comprising

(1) preparing the first block B by mixing the monomer(s) with an alkoxyamine of formula:



- where R' and R, which are identical or different, optionally connected so as to form a ring, are alkyl groups having between 1 and 40 carbon atoms optionally substituted by hydroxyl, alkoxy or amino groups; - where R_L is a monovalent group with a molar mass of greater than 16 g/mol; and- where Z is a polyvalent radical carrying end functional groups of styrol or acryloyl, adding a nitroxide, and

carrying out the polymerization at temperatures ranging from 60 to 250°C, ~~for~~ pressures ranging from 0.100 bar to 80 bar,

(2) diluting the first block B obtained in the mixture of monomers intended to form the block A compatible to the brittle matrix which is desired to see reinforced against impact, adding between 0 and 100 molar equivalents of a radical polymerization initiator, carrying out the polymerization at temperatures ranging from 60 to 250°C, and ~~for~~ pressures ranging from 0.100 bar to 80 bar, the conversion of the monomer ~~varies being~~ from 10 to 100%, and

separating the polymer obtained from the residual monomers by evaporation under vacuum at temperatures ranging up to 250°C,

(3) mixing the product obtained in step (2) with the brittle matrix which it is desired to see reinforced against impact, optionally in the presence of other additives; and

wherein A represents from 50% to 95% by weight of the total weight of the block copolymer (II) and the average molar mass of A is between 10,000 to 10⁶ g/mol.